iMcV-E1-Mux/4

Operation Manual

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Warranty

IMC Networks warrants to the original end-user purchaser that this product, EXCLUSIVE OF SOFTWARE, shall be free from defects in materials and workmanship under normal and proper use in accordance with IMC Networks' instructions and directions for a period of six (6) years after the original date of purchase. This warranty is subject to the limitations set forth below.

At its option, IMC Networks will repair or replace at no charge the product which proves to be defective within such warranty period. This limited warranty shall not apply if the IMC Networks product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than an authorized IMC Networks Service Technician or by any other causes unrelated to defective materials or workmanship. Any replaced or repaired products or parts carry a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

To receive in-warranty service, the defective product must be received at IMC Networks no later than the end of the warranty period. The product must be accompanied by proof of purchase, satisfactory to IMC Networks, denoting product serial number and purchase date, a written description of the defect and a Return Merchandise Authorization (RMA) number issued by IMC Networks. No products will be accepted by IMC Networks which do not have an RMA number. For an RMA number, contact IMC Networks at PHONE: (800) 624-1070 (in the U.S and Canada) or (949) 465-3000 or FAX: (949) 465-3020. The end-user shall return the defective product to IMC Networks, freight, customs and handling charges prepaid. End-user agrees to accept all liability for loss of or damages to the returned product during shipment. IMC Networks shall repair or replace the returned product, at its option, and return the repaired or new product to the end-user, freight prepaid, via method to be determined by IMC Networks. IMC Networks shall not be liable for any costs of procurement of substitute goods, loss of profits, or any incidental, consequential, and/or special damages of any kind resulting from a breach of any applicable express or implied warranty, breach of any obligation arising from breach of warranty, or otherwise with respect to the manufacture and sale of any IMC Networks product, whether or not IMC Networks has been advised of the possibility of such loss or damage.

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Table of Contents

FCC Radio Frequency Interference Statement ---- ii
Warranty ---- ii
About the iMcV-E1-Mux/4 ---- 1
    Managed Modules ---- 2
    Port Interfaces ---- 3
LED Operation ---- 5
    10/100BaseT Connector ---- 5
    E1 RJ-48 Connectors ---- 6
    SFP Ports ---- 6
Connector Pinout and DIP Switch Assignments ---- 7
    DIP Switch Assignments ---- 7
    10/100BaseT Ethernet Mating Connector Pinout ---- 8
    E1 Port Mating Connector Pinout ---- 8
    RS-232 Port Mating Connector Pinout ---- 9
    RS-232 Serial Console Port ---- 9
Installation Instructions ---- 10
Configuration Options ---- 11
    Ethernet Line Setup ---- 11
    Packet Size ---- 11
    Auto Negotiation ---- 11
    Forcing the Speed, Duplex Mode, and Flow Control ---- 11
    FX LinkLoss and *LFPT* ---- 11
    FX LinkLoss (FXLL) ---- 12
    Link Fault Pass-Through (*LFPT*) ---- 12
    E1 Ports Setup ---- 12
    Alarm Level ---- 12
    Loopback ---- 13
Console Screens ---- 14
  Login Screen ---- 14
  Main Menu ---- 15
    Menu Options ---- 16
  Unit Configuration Screen ---- 16
  Port Alarm Status Screen ---- 17
  SFP Line Status Screen ---- 17
  Ethernet Port Configuration Screen ---- 18
  Ethernet Port Status Screen ---- 18
  E1 Port Configuration Screen ---- 19
  E1 Port Status Screen ---- 19

Troubleshooting ---------- 21
Fiber Optic Port Verification ---------- 22
E1 Port Verification ---------- 23
Normal Operation ---------- 24
Fiber Optic Cleaning Guidelines ---------- 24
Electrostatic Discharge Precautions ---------- 25
Specifications ---------- 27
Standards/Compliance ---------- 27
Definition of Terms/Acronyms ---------- 28
IMC Networks Technical Support ---------- 30
Safety Certifications ---------- 31

About the iMcV-E1-Mux/4

Overview

The iMcV-E1-Mux/4 is a media converter that transports four independent E1 lines over an existing single (or dual, "*1+1*") standard 155Mbps-capable fiber optic line operating at an effective rate of 150Mbps. One serial link (RS-232) and one Ethernet (10/100BaseT) connection are also multiplexed onto the fiber link(s). Each of these communication channels is transported end-to-end at full wire speed with very low latencies.

The serial link can be used for extending an independent RS-232 interface to the remote *POP* location for use in managing or controlling other devices at the *POP* and supports any data rate up to 250K baud. In addition, each unit also supports an RS-232 console port for local configuration by technical support personnel. Both of these serial links are used for end-to-end system management, fault detection/isolation and system diagnostics.

The iMcV-E1-Mux/4 provides fault indications on the E1 and fiber links resulting from real-time active faults. The equipment detects both E1 and fiber *LOS* events as well as degraded E1 or fiber lines. The unit will automatically forward *AIS* signaling to the remote unit after detecting an *LOS* (Loss Of Signal) condition on any incoming E1 line. Severe receive optical link failures will result in the automatic generation of *AIS* signaling onto the E1 lines connected to the unit receiving the corrupted optical signal.

In addition, *CV* (Code Violation) errors are detected on all incoming E1 lines and *BER* calculations for the optical line are constantly being performed by circuitry within the unit's optical receiver. Error conditions are displayed on the unit's front panel *LED* indicators and reported to system management software (if equipped) where more detailed error information can be displayed on the user's *GUI*.

Systems equipped with *1+1* fiber redundancy can benefit from the enhanced reliability of a protected fiber link and the system's ability to automatically switch to the "best" fiber line should one line become impaired or fail. This automatic switchover capability is designed to occur rapidly (<50 milliseconds), minimizing data loss and system down time. In addition, automatic switchover can be overridden; this allows the end-user to force the unit to receive on a specific optical line if desired to support periodic maintenance.

The iMcV-E1-Mux/4 is sold in two configurations:

Part Number	Description
857-14400	A fully featured version with 1+1 Fiber protection and Ethernet transport.
857-14300	A Reduced feature version with a single fiber port and no Ethernet transport.

The iMcV-E1-Mux/4 offers the following features:

- Four E1 ports on RJ-48 connectors with surge protection
- One full bandwidth Ethernet 10/100BaseT port (specific model)
- *1+1* protection switching via two *SFP*-based optical ports (specific model)
- *DDMI* supported on *SFP* ports
- One end-to-end serial RS-232 port on an RJ-48 connector
- Local *CLI* management console port on a Mini Jack connector
- Remote management capability through iMediaChassis series
- *AIS* generation on signal loss on all E1 interfaces
- *SNMP* Alarm TRAP reporting in managed chassis
- *MDI/MDIX automatic Ethernet port switching*

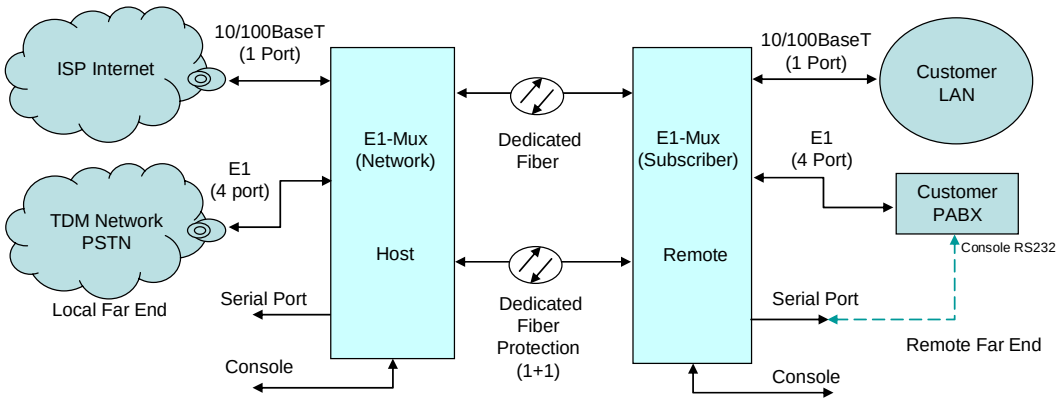
The iMcV-E1-Mux/4 module is a dual-wide iMcV module.

Compatible chassis include the following:

- iMediaChassis series
- MediaChassis series
- IE-MediaChassis series

Product Application

The iMcV-E1-Mux/4 delivers 4 E1 lines to a customer's site over a protected, dedicated fiber line. In addition, one serial RS-232 line and one 10/100BaseT Ethernet line can be carried at the same time. All circuits run at full line rates with no interaction.



Managed Modules

The iMcV-E1-Mux/4 modules are installed as a Host/Remote pair. Host or Remote configuration is selected by an onboard DIP Switch setting. The Host/Remote pair can be remotely managed when the HOST is installed in an iMediaChassis with an *SNMP* Management Module.

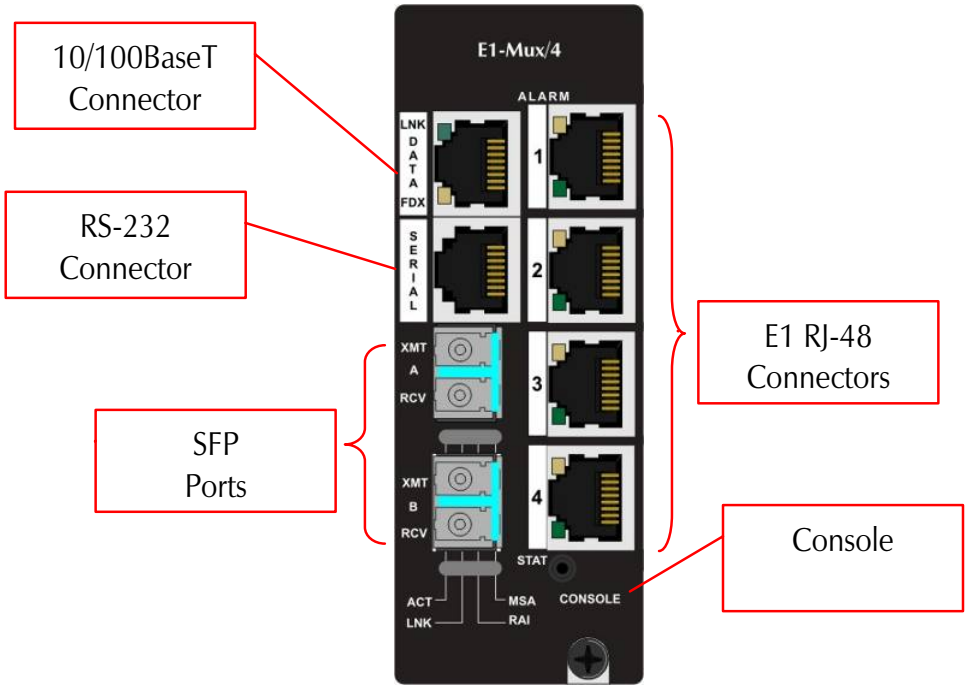
Port Interfaces

A fully-configured iMcV-E1-Mux/4 includes the following ports:

- Four E1 ports on RJ-48 connectors short haul
- One 10/100BaseT twisted pair Ethernet port (optional)
- One fiber *SFP* port (requires *SFP*/155-ED module for each port)
- Optional *SFP* port for optical *1+1* protection.
- One Mini Jack serial RS-232 serial console port
- One user serial RS-232 data port (RJ-45)

The iMcV-E1-Mux/4 is easily configured by using the serial console port connection or through an *SNMP* management application such as iView².

Console Serial Port Connection



The iMcV-E1-Mux/4 includes a console serial port. To establish a link between a module's console port and a local PC, connect the Mini Jack to DB9 adapter that is included with the IMC module. This RS-232 serial connection provides access to the iMcV-E1-Mux/4 module *CLI* configuration screens. Set the computer/terminal for **VT-100 emulation**, **38.4K baud**, **8 data bits**, **1 stop bit**, **no parity** and **no flow control**. Under the VT-100 emulation, set the backspace key to send delete.

iView² Management Software

iView^2 is the IMC Networks management software designed specifically for the IMC Networks "iMcV" family of modules. It features a *GUI* and gives network managers the ability to monitor and control the manageable IMC Networks products.

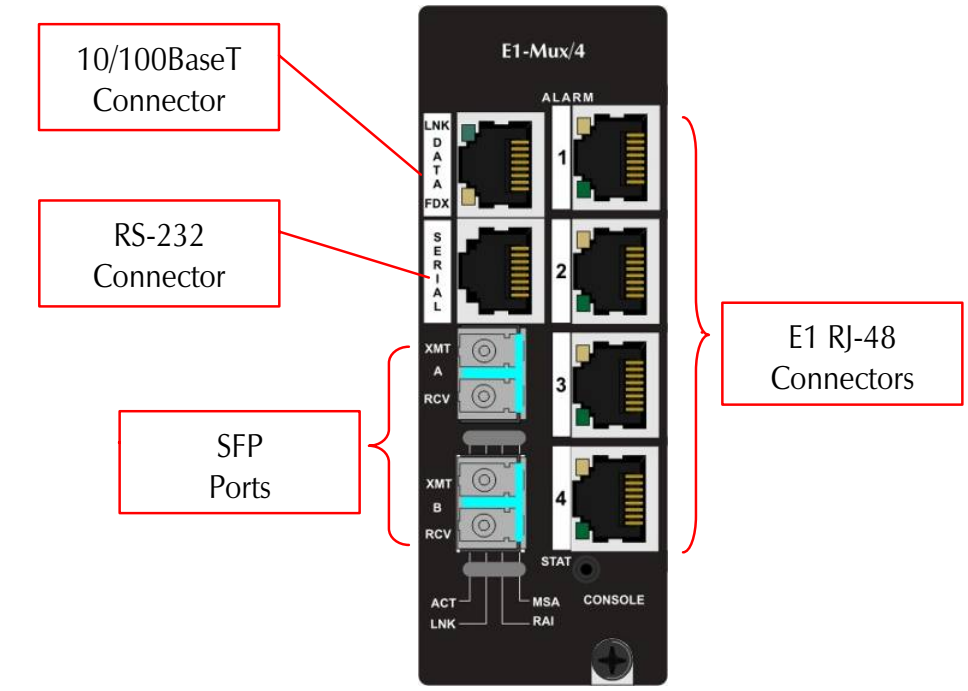
iView^2 is available in several versions and can also function as a snap-in module for HP OpenView Network Node Manager and other third party SNMP Management software. For assistance in selecting the right version of iView^2 for your operating system, please visit:
http://www.imcnetworks.com/products/iview2.cfm

iView^2 supports the following platforms:

- Windows NT
- Windows 2000
- Windows XP

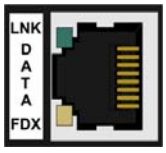
In addition, there are Java versions of iView^2 for any Java-capable operating systems such as Linux.

Please see the *SNMP* Management Module for software configuration options.



The iMcV-E1-Mux/4 features diagnostic *LED*s as explained below.

10/100BaseT Connector



LNK:

- OFF when port is not linked/connected
- Glows green when link is established
- Blinks green during data activity

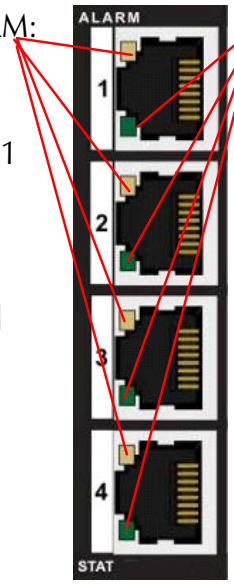
FDX:

- OFF when port is not connected or when running at half-duplex
- Glows yellow when port is running at full duplex
- Blinks yellow when collisions occur

E1 RJ-48 Connectors

ALARM:

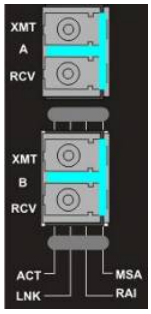
- OFF during normal operation
- Blinks red+green simultaneously when *CV* errors detected on the E1 line at far end of the optical line
- Glows red+green when loss of service (*LOS*) is detected, OR continuous bit errors are detected on the E1 line at far end of the optical line
- Blinks red when local *CV* errors detected on E1 line.
- Glows red when *LOS* detected on the local E1 line, OR when continuous errors are detected on the local E1 line



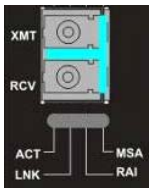
STAT:

- Glows green during normal operation
- Glows red+green when out-of-service or when the port is in a loopback or test state
- Glows red when the Host to Remote fiber link(s) is down or badly corrupted

SFP Ports



or



One model offers two *SFP* (A and B) ports for *1+1* protection; a second model offers one *SFP* without protection.

ACT:

- Glows green when the *SFP* port is the active receive line.
- OFF when the *SFP* is not the receive line
- Glows red+green when the *SFP* port is manually forced to be the active receive line

LNK:

- Glows green when there is a valid link
- Glows red when a loss of optical signal occur, *LOF*, or with continuous optical bit errors

RAI:

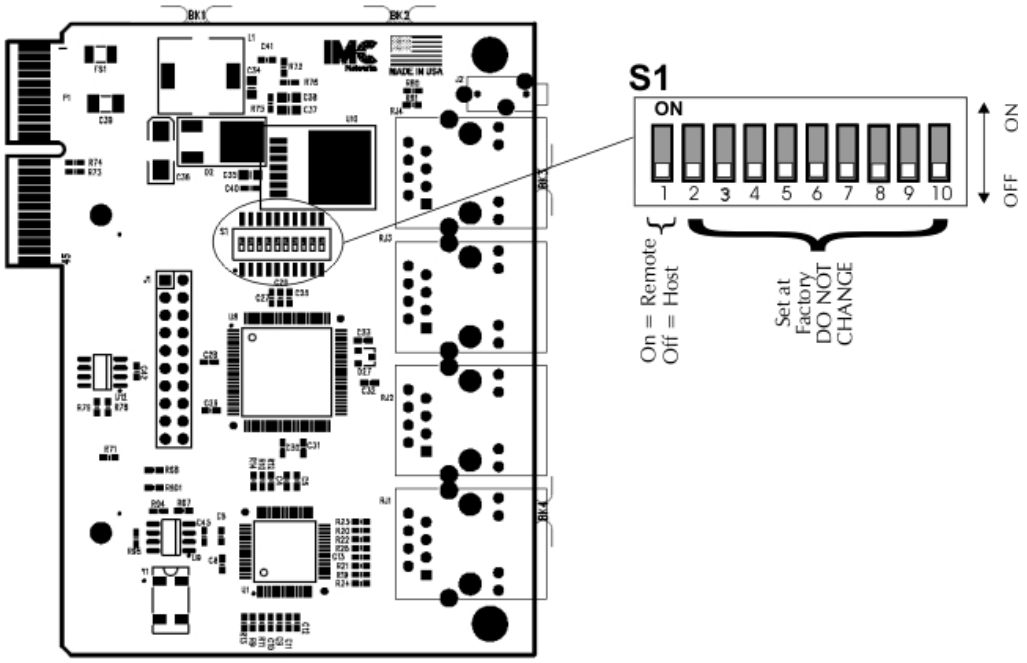
- Off when no remote defects are detected
- Glows red+green when remote *LOS* or *BER* detected

MSA:

- Off when *SFP* is not an IMC Networks *SFP*
- Glows green when no *SFP* alarms are detected
- Glows red+green when *SFP* alarms or defects are detected at remote end
- Glows red when *SFP* alarms or misconfigurations are detected locally, i.e., when the *SFP* is missing, or when *SFP* speed is not at 155Mbps

DIP Switch Assignments

A single 10-position DIP Switch is located on the unit to set the configuration. The switch positions are defined as follows:



IMcV-E1-Mux/4

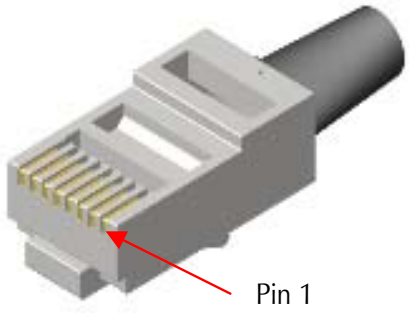
Switch #	Function	Settings	Factory Default
1	*Host/Remote*	*OFF = Host, ON = Remote*	*OFF*
2	*Reserved*	*OFF*	*OFF*
3	*Reserved*	*OFF*	*OFF*
4	*Reserved*	*OFF*	*OFF*
5	*Reserved*	*OFF*	*OFF*
6	*Reserved*	*OFF*	*OFF*
7	*Reserved*	*OFF*	*OFF*
8	*Reserved*	*OFF*	*OFF*
9	*Reserved*	*OFF*	*OFF*
10	*Reserved*	*OFF*	*OFF*

NOTE
Switch #1 must be set to ON at the Remote location. *Switches #2 through #10 are reserved for factory use only and must be OFF for proper operation.*

10/100BaseT Ethernet Mating Connector Pinout

The following table lists the pin configuration for the standard RJ-45 Ethernet connector.

Pin	Signal
1	*Transmit +*
2	*Transmit -*
3	*Receive +*
4	*None*
5	*None*
6	*Receive -*
7	*None*
8	*None*

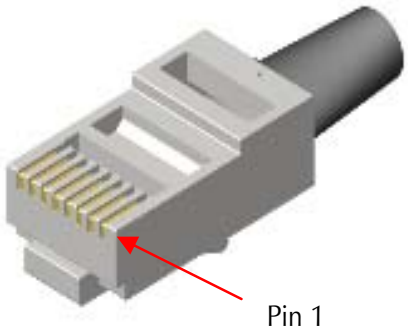


NOTE
MDI/MDIX AutoCross function will automatically transpose the Transmit and Receive lines if required.

E1 Port Mating Connector Pinout

The following table lists the pin configuration for the standard RJ-48 E1 port mating connectors.

Pin	Signal
1	*Receive 1 (Tip in to unit)*
2	*Receive 2 (Ring in to unit)*
3	*None*
4	*Transmit 1 (Tip from unit)*
5	*Transmit 2 (Ring from unit)*
6	*None*
7	*None*
8	*None*

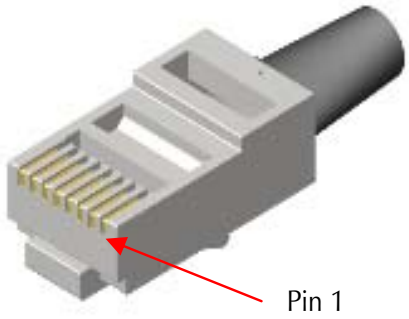


NOTE
The pin configuration is consistent with a DTE interface.

RS-232 Port Mating Connector Pinout

The following table lists the pin configuration for the RS-232 port mating connector.

Pin	Signal
1	*None*
2	*None*
3	*None*
4	*Signal Ground*
5	*Receive Data (in to unit)*
6	*Transmit Data (out of unit)*
7	*None*
8	*None*



This port provides an end-to-end RS-232 line that can support up to 250K Baud and is transparent to all RS-232 protocols.

RS-232 Serial Console Port

The following table lists the pin configuration for the RS-232 3-pin Mini Jack mating connector for the console serial port.

Pin	DB9-F Pin#	Signal Name	Direction
Tip	*2*	*Transmit*	*Out of Unit*
Ring	*3*	*Receive*	*In to Unit*
Sleeve	*5*	*Return*	*Return*

Installation Instructions

Each iMcV-E1-Mux/4 module requires two adjacent slots in an iMediaChassis or MediaChassis. To install the module in a chassis, remove the blank faceplates covering the slots where the module is to be installed. Then slide the module into the chassis card guides until the module is seated securely in the slots. Secure the module to the chassis by tightening the captive screw.

All iMcV-E1-Mux/4 units are shipped from the factory configured as **Host** units. The iMcV-E1-Mux/4 modules must be installed in pairs. For two iMcV-E1-Mux/4 units to properly operate together one unit needs to be configured as a **Remote**. Configuration as a Host or Remote is controlled via a DIP switch setting (S1-1).

Small Form-Factor Pluggable Ports (*SFP*)

The fiber link on the iMcV-E1-Mux/4 module is supported through one or two *SFP*s (depending on the model) running at 155Mbps. Many *SFP*s, including those from IMC Networks, feature enhanced diagnostics capabilities DDMI (Data and Diagnostic Management Information). *DDMI* statistics provide real-time access to transceiver operating parameters such as voltage, temperature, laser bias current, and both transmitted and received optical power. *DDMI* information can be accessed in iView^2.

AutoCross Feature

The 10/100BaseT Ethernet port on the iMcV-E1-Mux/4 includes an AutoCross feature that automatically selects between a crossover workstation and a straight-through connection depending on the connected device.

Configuration Options

The following sections describe the configurable features.

Use the "default" command to restore the unit's default settings. This restores the card's default configuration and resets the default username and password.

User: **admin** / Password: **admin**

Ethernet Line Setup

If the Ethernet port is not used, it can be set to disabled via a console session or via iView², to effectively block all traffic on this port.

Packet Size

The Ethernet transport can accommodate packets up to 1916 bytes.

Auto Negotiation

The iMcV-E1-Mux/4 ships from the factory with Auto Negotiation enabled on the Ethernet port. In this mode, the port negotiates for speed, duplex and flow control.

Forcing the Speed, Duplex Mode, and Flow Control

The Ethernet port on the iMcV-E1-Mux/4 can be selectively advertised or manually forced for 10 Mbps or 100 Mbps operation at Half- or Full-Duplex (i.e., 10 Mbps Full-Duplex, 10 Mbps Half-Duplex, 100 Mbps Full-Duplex, etc.). Flow control can also be enabled on the Ethernet port when the connecting equipment supports this. These features can be enabled through iView².

FX LinkLoss and *LFPT*

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When an iMcV-E1-Mux/4 receives valid link pulses, it knows that the device to which it is connected is up, and that the cable coming from that device is intact. The appropriate “LNK” (link) *LED* is lit to indicate this. However, these signals are not normally transmitted across a normal store and forward Ethernet bridge function. A failed Ethernet line on one end of the fiber link is not forwarded to the Ethernet port at the other end of the optical transport. A failed optical line is also not normally forwarded to the Ethernet port. The FX LinkLoss and LFPT functions are used to enable these features.

For troubleshooting information utilizing the FX LinkLoss and *LFPT* features of the iMcV-E1-Mux/4 modules, refer to *Troubleshooting* at the end of this manual.

Both the LinkLoss and *LFPT* features are set to "Disabled" by default.

FX LinkLoss (FXLL)

FX LinkLoss is a link integrity monitoring feature that forwards fiber link faults to the RJ-45 DATA port to indicate that a fiber link fault has occurred. FX LinkLoss can be enabled in iView^2.

Link Fault Pass-Through (*LFPT*)

Link Fault Pass-Through (*LFPT*) is a troubleshooting feature that passes a link fault from the Ethernet port on one module through to the Ethernet port on the other module. *LFPT* can be enabled via iView^2 or through the console port.

The link fault is passed through the media conversion and is observed at each end. It acts just as it would if the end devices were directly connected without a fiber link.

E1 Ports Setup

Alarm Level

E1 lines are defined as LOST when no signal is received as defined by ITU G.775 specifications *LOS*, and are considered in error with a *BER* of 10 ^ -6. If either of these conditions lasts for more than 2.5 seconds, an ALARM state is declared. This error condition must be absent for 10 seconds for the alarm state to clear.

The starting and ending event of all alarm conditions will generate an *SNMP* TRAP when the unit is installed in a managed chassis and set to the IS state. During initial installation or normal maintenance, the end-user can place the unit in the *OOS* (Out-Of-Service) state to inhibit unwanted *SNMP* TRAP alarms.

Loopback

Each E1 port can be tested in loopback mode by enabling either a Host loopback or Remote loopback test path. This capability allows the end-user to help troubleshoot and isolate system problems such as improper/broken line terminations, cables or malfunctioning equipment.

With Host loopback, the E1 copper port, connected to the Host unit, is looped back to that port within the local unit. E1 data coming from the remote unit to that port over the optical link is also looped back to the remote unit at the same point within the local unit.

With remote loopback, an E1 line connected to the Host unit is transported onto the optical link and looped back within the remote unit back onto the optical link without passing onto the copper E1 line of the remote unit. The remote's incoming E1 copper line is also looped-back to the copper line within the remote unit.

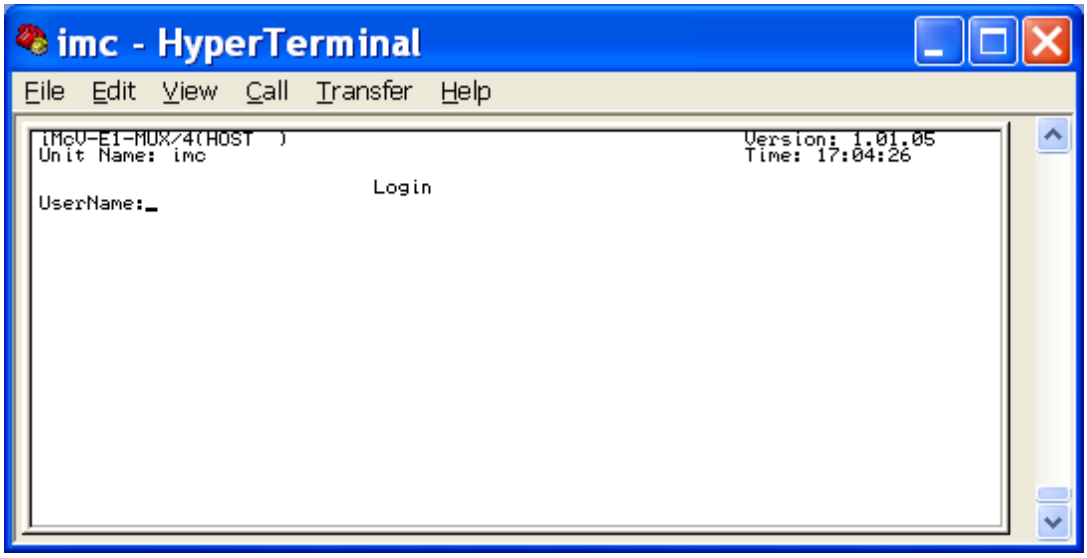
The default value for loopback is "none."

Configuration Using the Console Port

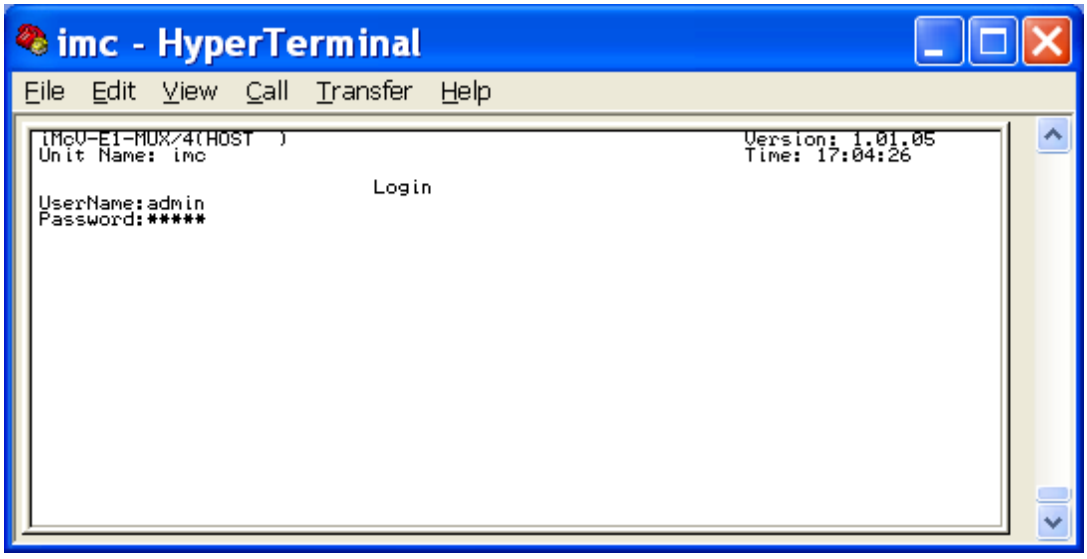
The following section describes configuration using the console screens. The Remote module is only configured through the Host.

Login Screen

After running through an initial self test, the log-in screen is displayed (the diagnostic information displayed below is for illustration purposes only and may differ from the actual screen display):



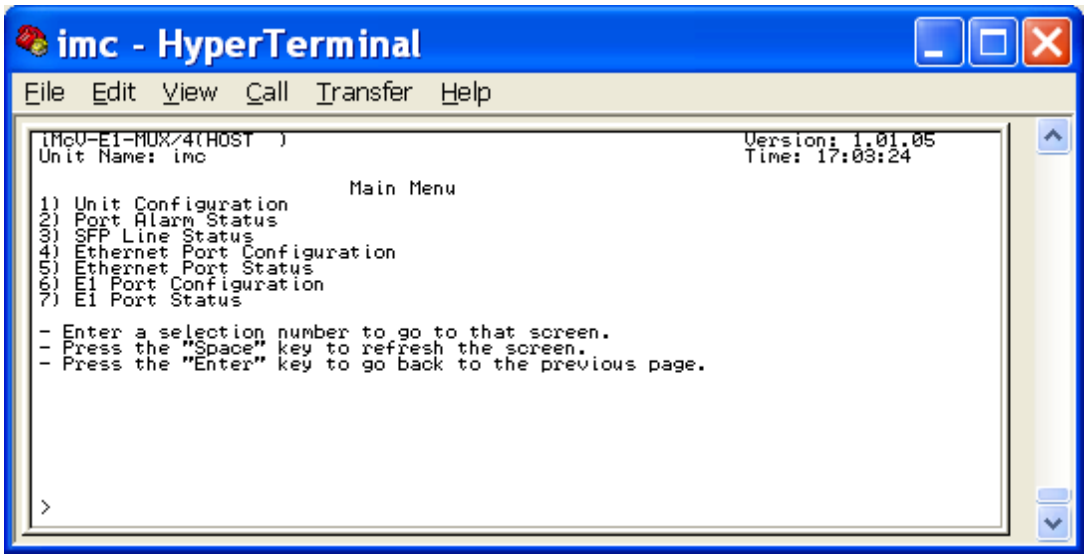
The username is case sensitive with a maximum length of 16 characters. After a username is entered, the system prompts the end-user for a password.



Password is case sensitive with a maximum length of 16 characters. After the system validates the username and password, the Main Menu is displayed.

Main Menu

From the main menu, the end-user can view essential unit configuration data—including active alarms in order of importance—and a clock indicating when the displayed information was last refreshed.


imc - HyperTerminal
File Edit View Call Transfer Help
(MoV-E1-MUX/4(HOST)
Version: 1.01.05
Unit Name: imc
Time: 17:03:24
Main Menu
1) Unit Configuration
2) Port Alarm Status
3) SFP Line Status
4) Ethernet Port Configuration
5) Ethernet Port Status
6) E1 Port Configuration
7) E1 Port Status
- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>

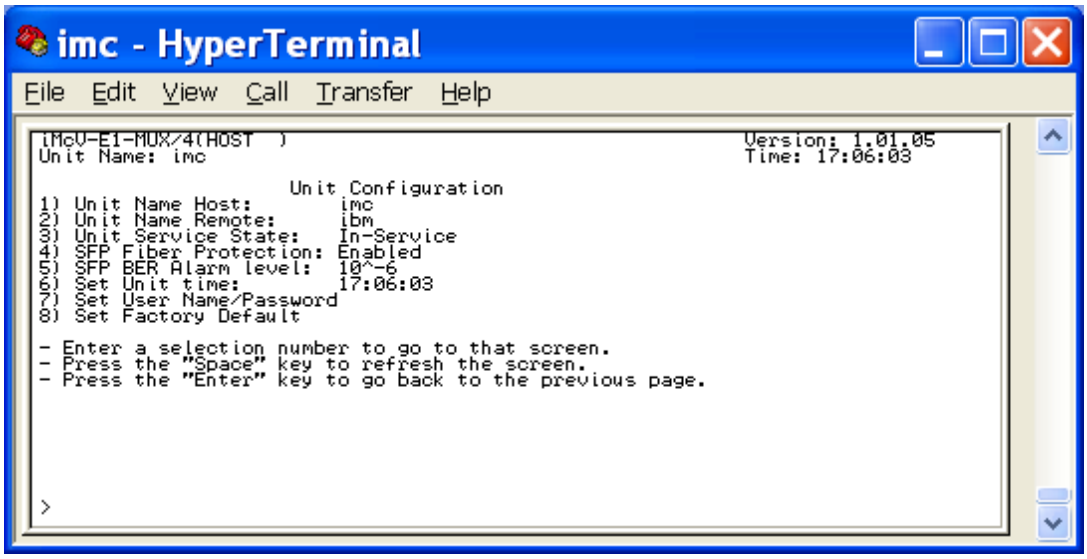
Menu Options

1 = Refer to the **Unit Configuration Screen**
2 = Refer to the **Port Alarm Status** screen
3 = Refer to the ***SFP* Line Status** screen; *SFP DDMI* alarms are also displayed
4 = Refer to the **Ethernet Port Configuration** screen
5 = Refer to the **Ethernet Port Status** screen
6 = Refer to the **E1 Port Configuration** screen
7 = Refer to the **E1 Port Status** screen

NOTE
On all configuration screens, the title is the same as the "option" selected from the previous screen.

Unit Configuration Screen

The unit configuration screen displays the names of the Host and Remote units as well as the service state, whether fiber protection is enabled and the SFP *BER* alarm level. In addition, the unit time can be set from this screen and the username and password can be set/reset.

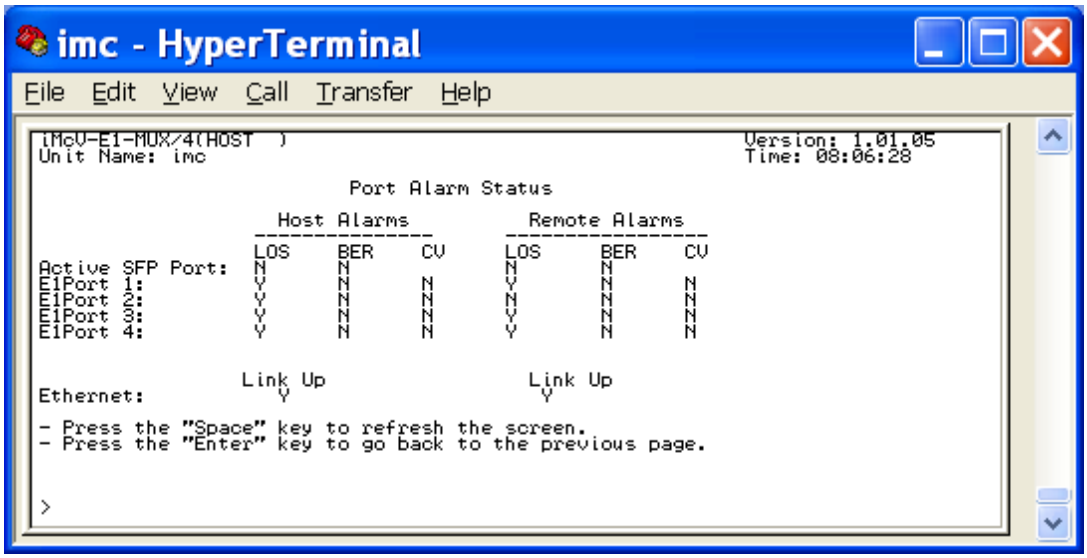

imc - HyperTerminal
File Edit View Call Transfer Help
iMcV-E1-MUX/4(HOST)
Version: 1.01.05
Unit Name: imc
Time: 17:06:03
Unit Configuration
1) Unit Name Host: imc
2) Unit Name Remote: ibm
3) Unit Service State: In-Service
4) SFP Fiber Protection: Enabled
5) SFP BER Alarm level: 10^-6
6) Set Unit time: 17:06:03
7) Set User Name/Password
8) Set Factory Default
- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>

The screen displays the current status for items 1 through 8. For security reasons, the current username and password are not displayed.

For items 1 through 8, enter the number of the menu item to be changed, and then enter the new value when prompted. The unit and port names can be assigned by the end-user and are used in *SNMP* associated TRAP alarm messages.

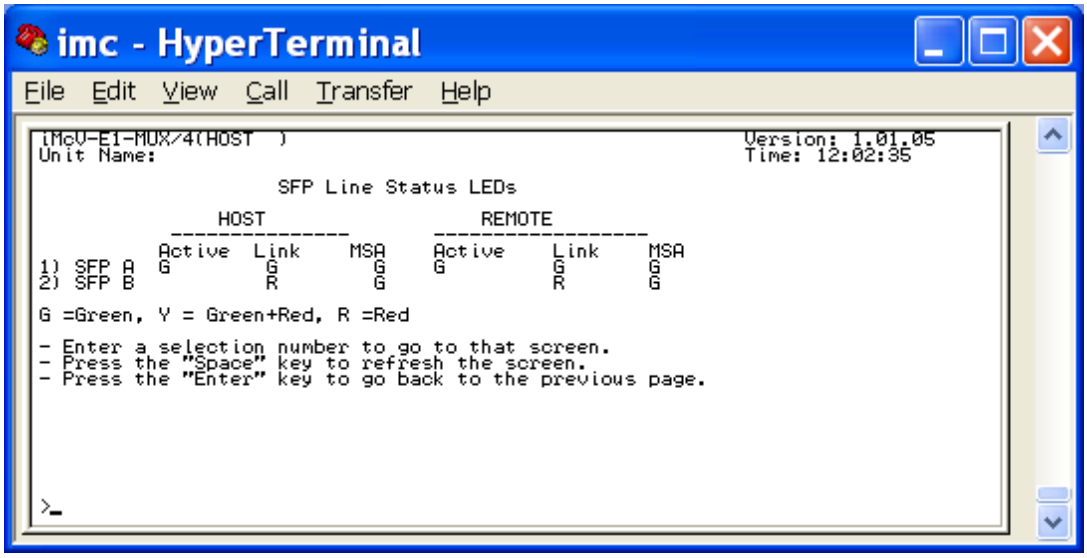
Port Alarm Status Screen

The Port Alarm Status screen displays the status of the Host and Remote alarms on each of the unit's ports. This screen can be refreshed as needed to display current data.


imc - HyperTerminal
File Edit View Call Transfer Help
(McV-E1-MUX/4(HOST)
Unit Name: imc
Version: 1.01.05
Time: 08:06:28
Port Alarm Status
Host Alarms
Remote Alarms
LOS BER CV LOS BER CV
Active SFP Port: N N N N
E1Port 1: Y N N Y N N
E1Port 2: Y N N N N N
E1Port 3: Y N N Y N N
E1Port 4: Y N N Y N N
Link Up
Ethernet: Y
Link Up
Y
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>

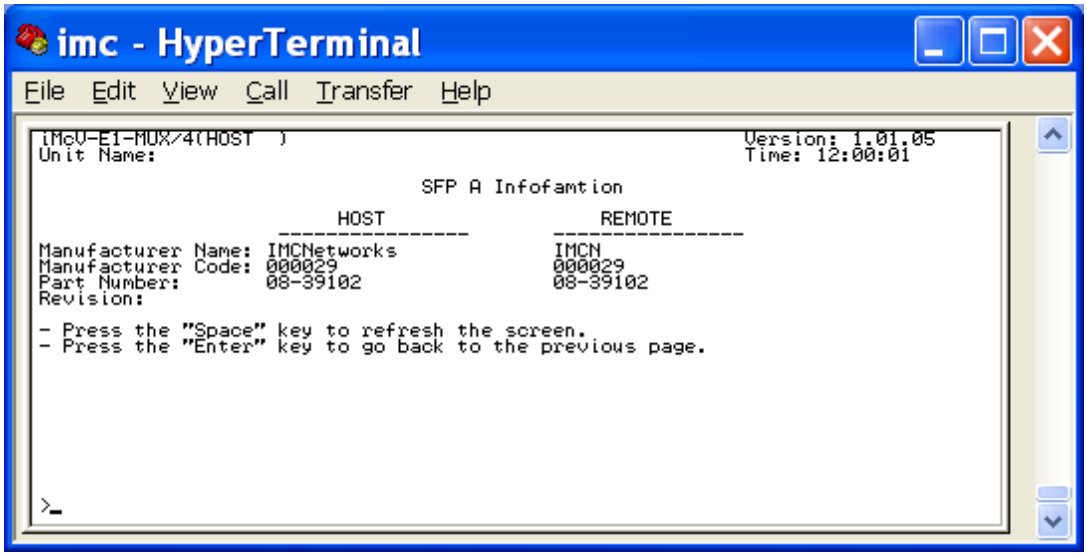
SFP Line Status Screen

The *SFP* Line Status screen displays the status of the Host and Remote *SFP* links.


imc - HyperTerminal
File Edit View Call Transfer Help
(McV-E1-MUX/4(HOST)
Unit Name:
Version: 1.01.05
Time: 12:02:35
SFP Line Status LEDs
HOST
REMOTE
Active Link MSA Active Link MSA
1) SFP A G G G G G
2) SFP B R G R G
G =Green, Y = Green+Red, R =Red
- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>

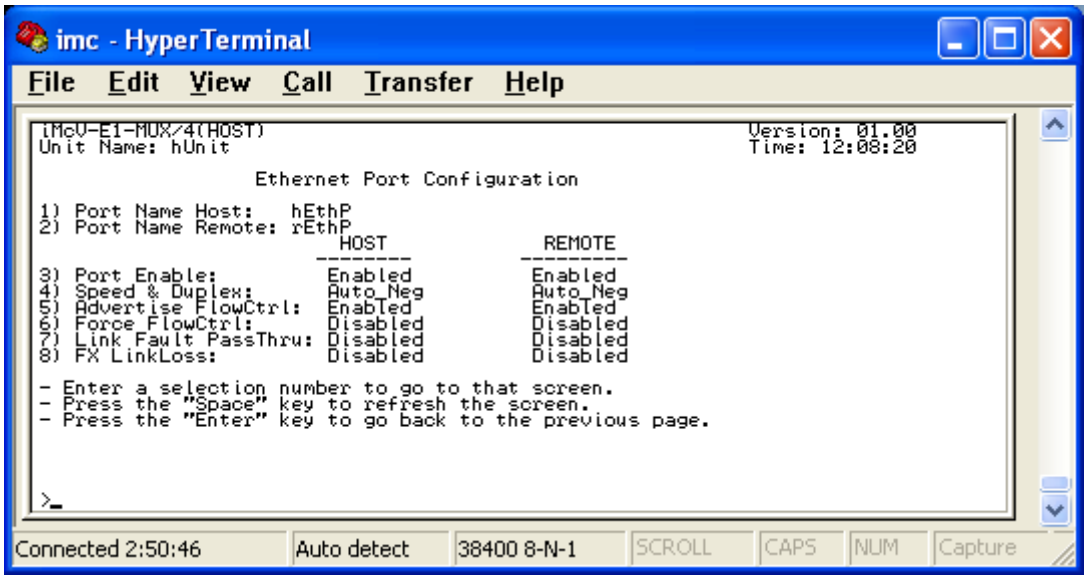
The detailed *SFP* information may be viewed by entering "1" for *SFP* A or "2" for *SFP* B. Displayed data includes the manufacturer name, code, part number and revision number. These values may not be modified.

For *SFP* modules that support *DDMI* values for temperature, voltage, diode current and optical receive/transmit, levels can be obtained through *SNMP* Management Module.



Ethernet Port Configuration Screen

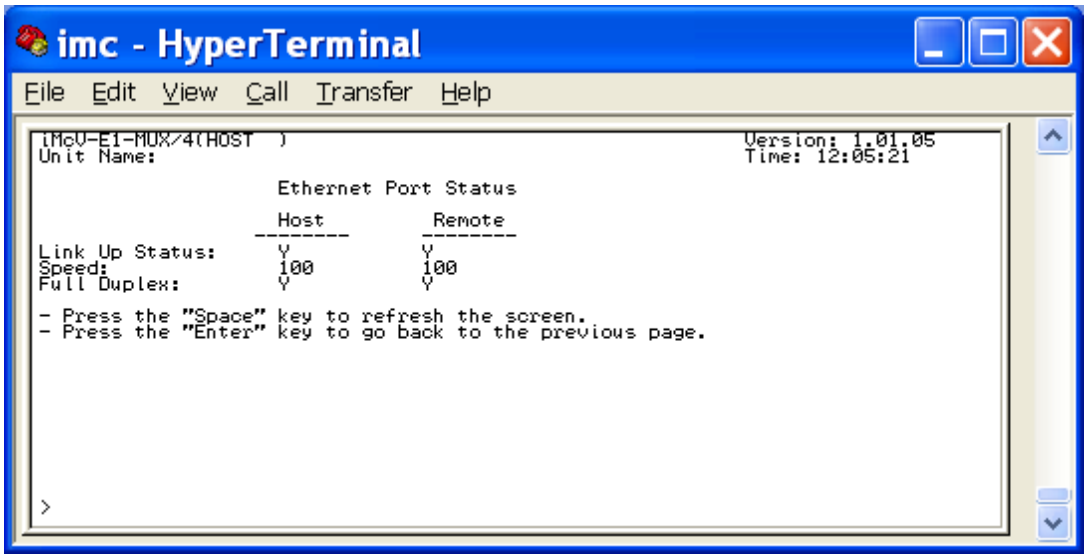
The screen displays the current values for items 1 through 9 for both the Host and Remote site.



Enter the number of the menu item to change its configuration, and then enter the new value(s) when prompted.

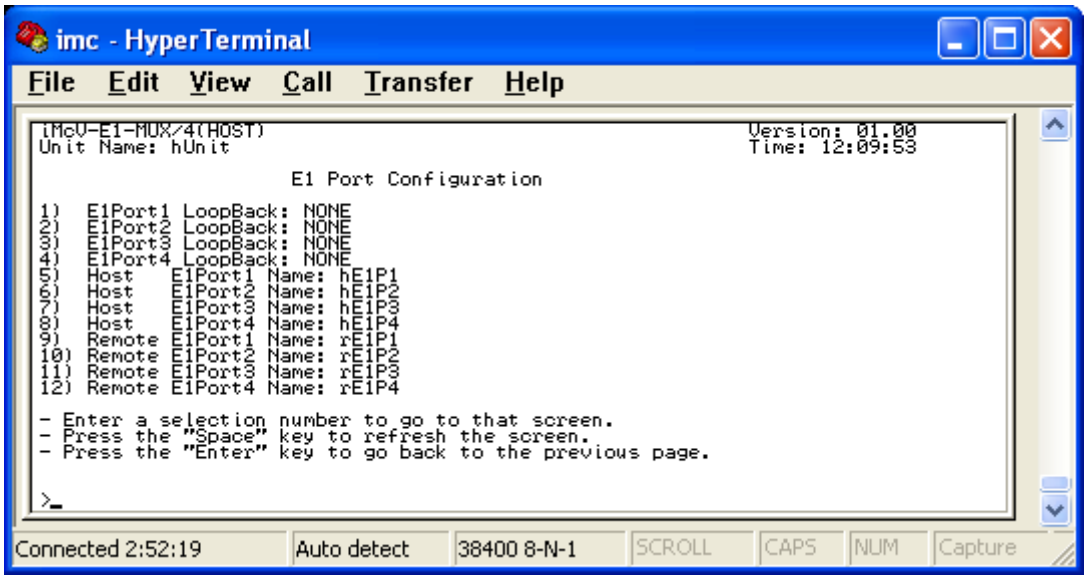
Ethernet Port Status Screen

This screen displays the current Ethernet port status for both the Host and Remote site.


imc - HyperTerminal
File Edit View Call Transfer Help
(MCV-E1-MUX/4(HOST)
Unit Name:
Version: 1.01.05
Time: 12:05:21
Ethernet Port Status
Host Remote
Link Up Status: Y Y
Speed: 100 100
Full Duplex: Y Y
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>

E1 Port Configuration Screen

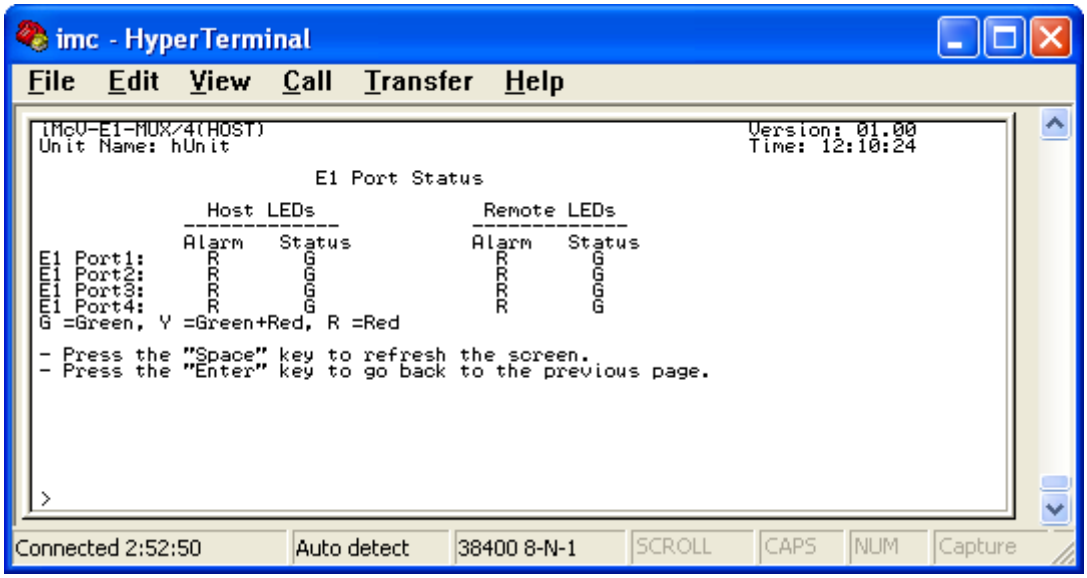
Use this screen to access the loopback and name details for each of the four E1 ports.



Enter the number of the menu item to edit, and enter the new value(s) when prompted.

E1 Port Status Screen

Use this screen to display the current status for each of the four E1 ports for the Host and Remote units.

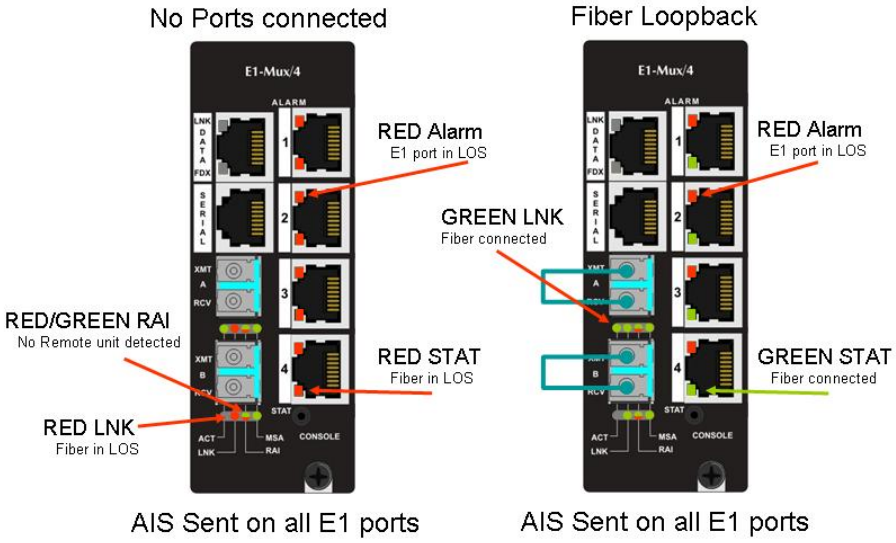


Enter the number of the menu item to edit, and enter the new value(s) when prompted.

- All iMcV-E1-Mux/4 units are shipped configured as Host units via DIP Switch #1 = OFF. The Remote unit should be set to DIP Switch #1 = ON. Be sure to confirm that the iMcV-E1-Mux/4 card is set correctly when used.
- The fiber transport is independent of all other ports and should be established first. If this is not possible, a physical fiber loopback can be used for fiber port verification. A fiber loopback will cause all connected ports to loop back their respected data.
- If the fiber is not connected, all E1 ports will send the all-ones, *AIS* signal. This can be physically looped back to verify E1 port operation.

Fiber Optic Port Verification

As a troubleshooting aid, the fiber optic ports can be verified by placing a physical loopback optical line on the ports and verify the *LED* behavior as shown:

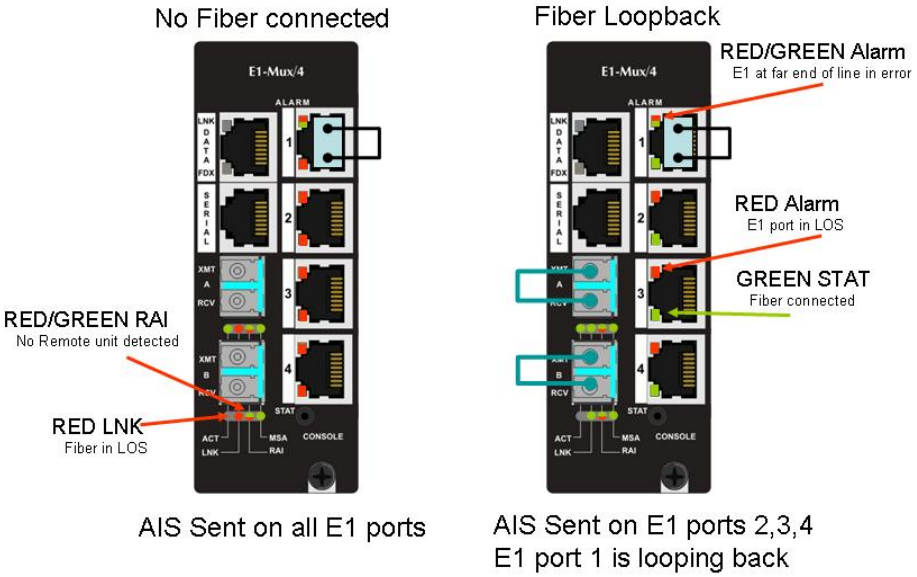


The ACT *LED* will arbitrarily be configured to either the A or B fiber line. The *RAI LED* is RED/GREEN indicating that there is something wrong at the far end of the fiber line (in this case, the remote unit is missing). The ALARM LED is RED because the E1 port is not connected. The STAT LED is RED when there is no fiber link but turns GREEN when the fiber link is valid.

NOTE
The E1 ports are all sending AIS. *However, with the fiber looped, it is because of the* LOS *on the E1 port. Without the fiber looped, it is because of the* LOS *of the fiber port.*

WARNING
An optical loopback will also loop back the Ethernet port. If the network cannot tolerate this, remove the Ethernet port connection before connecting the fiber loopback.

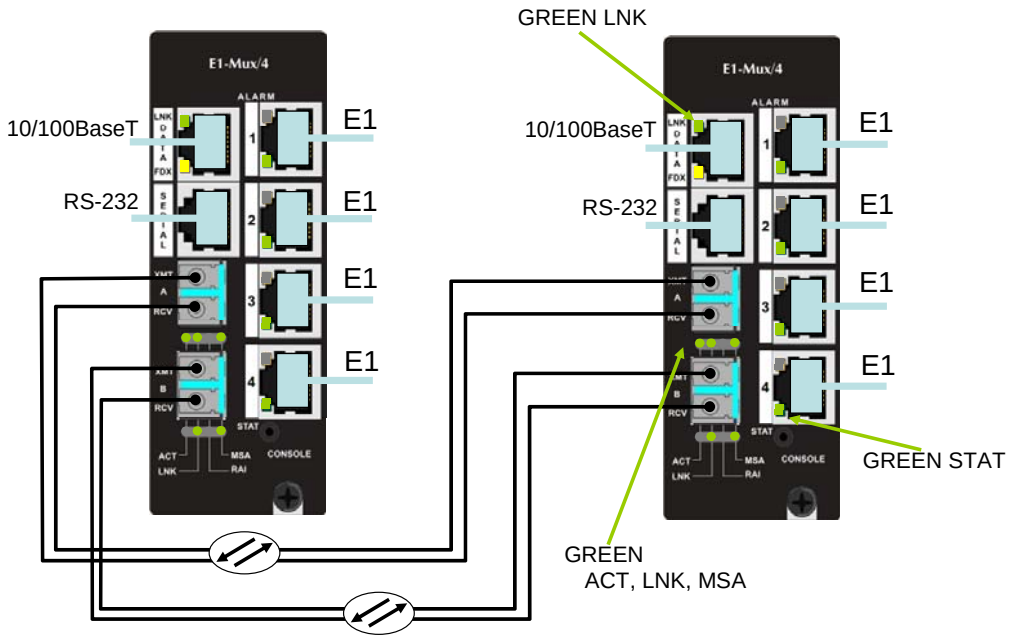
E1 Port Verification



By placing a physical loopback connection on the E1 port, a valid signal can be detected by each individual E1 port to verify its operation. Without the fiber looped, the ALARM *LED* for the looped E1 port will show RED/GREEN indicating there is a problem at the far end of the fiber transport (In this case the far end unit is missing) and the STAT LED is RED because the fiber is in LOS. With the fiber looped, the E1 port will only show a normal GREEN STAT LED.

Normal Operation

Under normal operation the following *LED* display is given:



Fiber Optic Cleaning Guidelines

Fiber optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

- Use fiber patch cords (or connectors, if the fiber is terminated) from a reputable supplier. Low-quality components can cause many hard-to-diagnose problems in an installation.
- Dust caps are installed at IMC Networks to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Ensure that the fiber is properly terminated, polished and free of any dust or dirt and that the location is as free from dust and dirt as possible.
- Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when they are reinstalled, they do not introduce any contamination to the optics.
- If it becomes necessary to disconnect the fiber device, reinstall protective dust caps.
- If it is suspected that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove dirt particles.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to add-in modules. Always observe the following precautions when installing or handling an add-in module or any board assembly.

1. Do not remove unit from its protective packaging until it is ready to be installed.

2. Wear an ESD wrist-grounding strap before handling any module or component. If a wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold boards by the edges only; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the board over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

Specifications

Power Consumption (Typical):
0.96A @ +5V DC

Operating Temperature:
32° to 122° F (0° to 50° C)

Storage Temperature:
-40° to 160°F (-40° to 70° C)

Humidity:
5 to 95% (non-condensing); 0 to 10,000 ft. altitude

Dimensions:
Dual Slot iMcV module

Standards/Compliance

- IEEE 802.3x Flow Control
- IEEE 802.3i 10Base-T twisted pair
- IEEE 802.3u 100Base-TX twisted pair
- IEEE 802.3u 100Base-FX or SX fiber
- ITU G.775
- GR-820-CORE

Definition of Terms/Acronyms

The following are terms and phrases used within this manual (shown in *italics*), or which are found in documents associated with this equipment.

1+1	The Term "1+1" refers to line protection where identical information is transmitted on two redundant lines. The Receiver chooses the "best" line to use based on the *BER* of the line.
AIS	Alarm Indication Signal: Used in E1 signaling, the AIS is a predetermined bit stream (all ones) that is transmitted (forwarded) upon the loss of an incoming E1 signal or when the E1 signal is disrupted.
AN	Auto Negotiation: A signaling protocol used by an Ethernet PHY to determine the characteristics (speed, duplex mode) of its "link partner" and configure itself automatically
BER	Bit Error Rate: The percentage of bits with errors divided by the total number of bits that have been transmitted, received or processed over a one second time period.
CLI	Command Line Interface: An interface screen, often DOS-based, used for system management and diagnostics requiring the user to type commands rather than use a *GUI*.
CV	Code Violation: An anomaly of a decoded physical-layer signal stream resulting in coding (signaling) error(s). Noise bursts or intermittent connections on a link are the usual causes of code violations; an *HDB3* coding error.
DDMI	Digital Diagnostic Monitor Interface: A defined serial interface and data format typically used to access SFP internal information
FFL	Fiber Fault Loopback: When the fiber line fails, the Ethernet port that is being forwarded over the fiber line is forced out of LINK. Similar to the Fiber Alert function.
GUI	Graphical User Interface: Software that provides a visual interface to enable an end-user to manage and monitor network devices.
HDB3	High Density Bipolar 3 Coding: A physical-layer signal encoding scheme defined for E1 transmission which ensures sufficient signaling transitions for robust clock/data recovery.
IS	In-Service stat is the normal state of an active port with normal error reporting.

LED	Light Emitting Diode: A small stack of lights to indicate link, duplex or other options.
LFPT	Link Fault Pass-Through: LFPT can be enabled via iView^2 or through the console port.
LOF	Loss Of Frame: An error condition where the receiver/decoder misses detection of the framing signal.
LOS	Loss Of Signal: An error condition where the receiving line interface unit does not detect a signal.
MDI/MDIX	Media-Dependent Interface/ Media-Dependent Interface Crossover. The ability of an Ethernet port to automatically detect and configure its cabling connections to accommodate crossover or non-crossover wiring, depending on its link partner and cabling.
MIB	Management Information Base: A database of objects that can be monitored by a network management system. Both SNMP and RMON use standardized MIB formats that allow any SNMP and RMON tools to monitor any device defined by a MIB.
MSA	Multi-Source Agreement (SFP): The standard an SFP must meet to be compatible in network devices.
OOS	Out-Of-Service, OOS is used by the CRAFT personnel to turn OFF the alarm reporting so they can service the line without causing alarm TRAPS to be sent to the NOC Center. The LEDs display a line status but do not report any line related alarms back to the NOC. A card removal or insertion is still reported, but a PORT up/down or changes to its configuration are not.
POP	Point(s) Of Presence: The demarcation point where carrier owned equipment is located at the customer site.
RAI	Remote Alarm Indication: Status information received from the line indicating there is an alarm condition at the far end of the transport.
SFP	Small Form-Factor Pluggable: An industry standard optical pluggable module.
SNMP	Simple Network Management Protocol: A set of protocols for managing complex networks over a standards-based IP network.

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Web: www.imcnetworks.com

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC).

CE

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.

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If the product's part number begins with an "8", it is compliant with the Restriction of Hazardous Substances (RoHS) directive.